DIRECTIONS
FOR BRINGING OVER
SEEDS AND PLANTS,
FROM
THE EAST-INDIES
AND
OTHER DISTANT COUNTRIES,
IN
A STATE OF VEGETATION:

TOGETHER WITH

A CATALOGUE of ſuch FOREIGN PLANTS as are worthy of being encouraged in our AMERICAN Colonies, for the Purpoſes of MEDICINE, AGRICULTURE, and COMMERCE.

TO WHICH IS ADDED,

The Figure and Botanical Deſcription of a new SENSITIVE PLANT, called

DIONÆA MUSCIPULA:
OR,
VENUS's FLY-TRAP.

BY

JOHN ELLIS, F. R. S.

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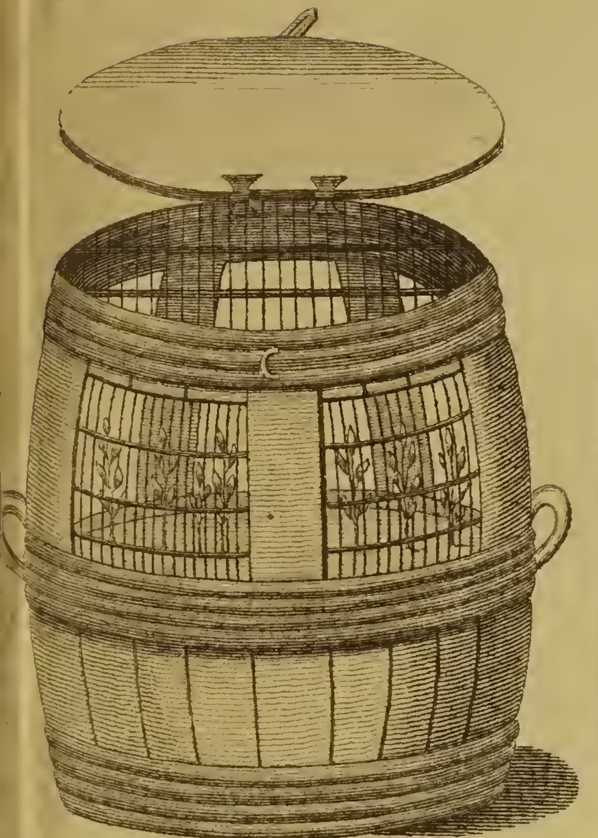
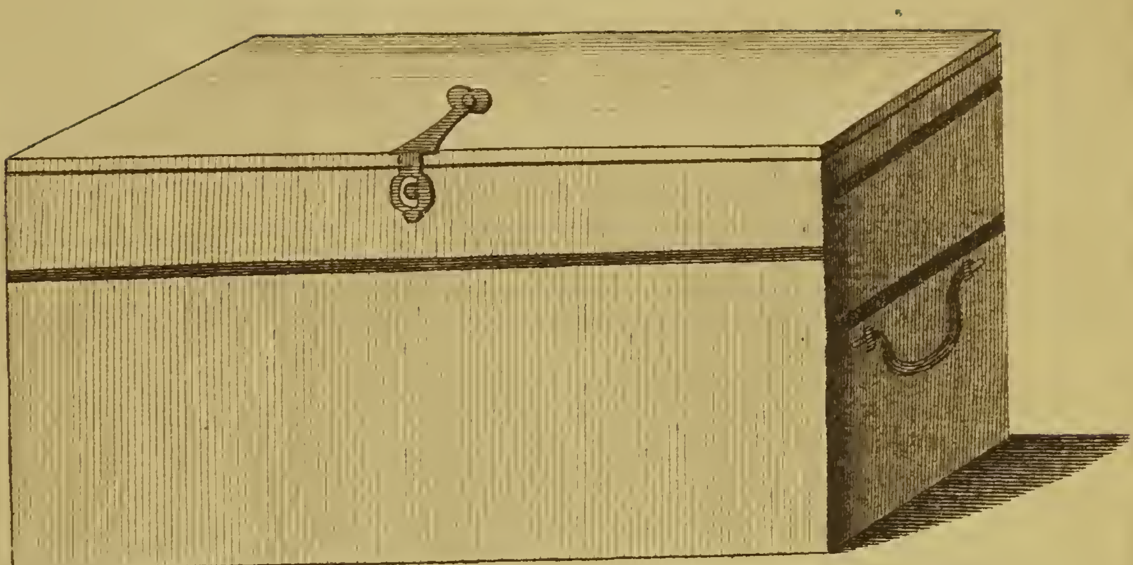
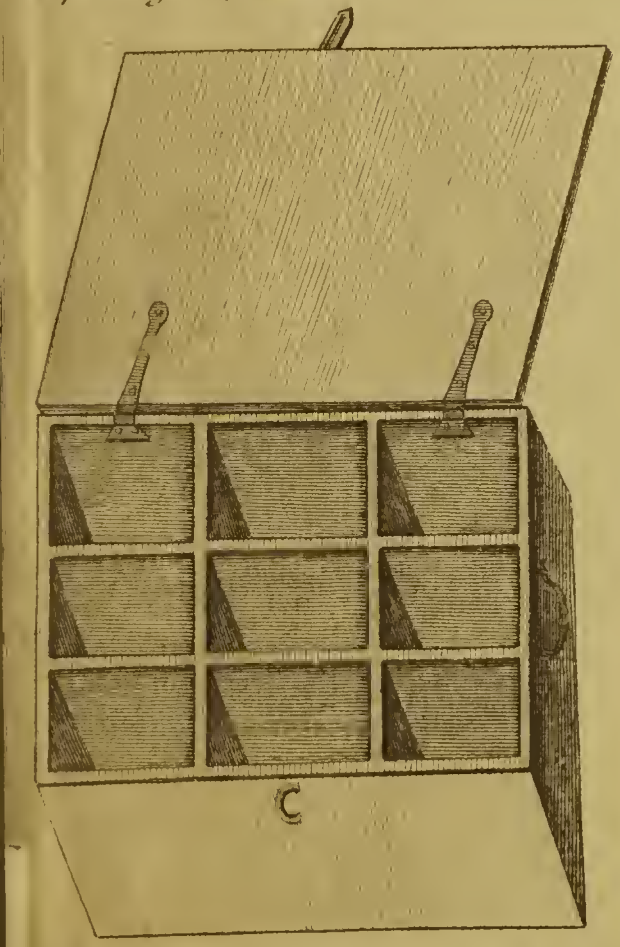


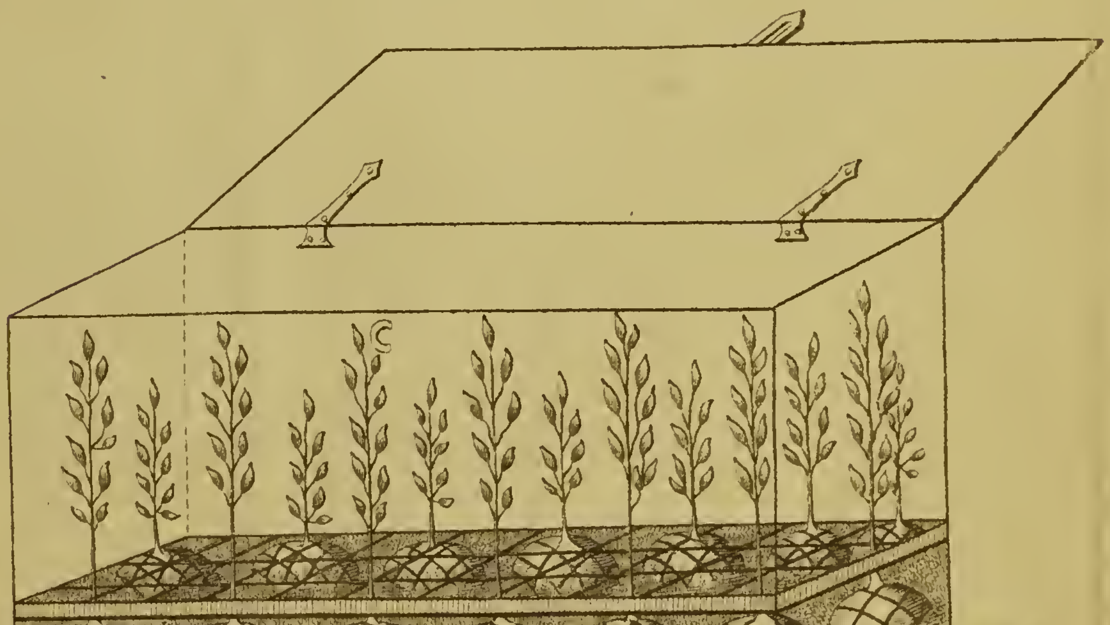
The Cask for sowing East India seeds with the openings defended by Wire.



The Box with West India and W. Florida plants shut down with the openings at the ends and front left for fresh Air.



The Box with divisions for sowing different eeds in earth & cut moſs from the southern Colonies and the West Indies.



The Inside of the box shewing the manner of securing the roots of W. Florida and W. India plants surrounded with earth & moſs tied with packthread and fastend croſs & croſs with laths or packthread to keep them steady.

C Broomfield

Directions for Captains of Ships, Sea Surgeons, and other curious Perſons, who collect Seeds and Plants in diſtant Countries, in what Manner to preſerve them fit for Vegetation.

IT might be reaſonably ſuppoſed, from the great quantity and variety of ſeeds which we yearly receive from China, that we ſhould ſoon be in poſſeſſion of the moſt valuable plants of that vaſt empire; yet it is certain, that ſcarce one in fifty ever comes to any thing, except a few varieties of annual plants, which have been common in our gardens for many years. The intention of thoſe who purchaſe or collect theſe ſeeds is, without doubt, to oblige the curious in theſe kingdoms, by procuring what they ſuppoſe may prove both ornamental and uſeful: but how contrary to their intentions do their friends find it, who, being under great obligations for this expenſive preſent, have the mortification to be totally diſappointed in their expectations! Theſe remarks are therefore intended to prevent, if poſſible, the like diſappointments for the future.

The crafty Chineſe traders, perceiving that many of the Europeans who buy theſe ſeeds are very little acquainted with the nature of them, take the advantage of their want of knowledge; and, in order the better to deceive them, put up a great variety of ſorts in a very neat manner: when the ſeeds arrive here, and come to be examined by perſons of judgement, they ſoon find that moſt of them have been collected many years; conſequently are decayed, and of no value. To prevent this fraud for the future, it would be proper to examine the ſtate they are in before they are purchaſed. And though it is very difficult to judge how long they may have been gathered, yet we may form a tolerable judgement of them by cutting ſome of the larger ones acroſs, and bruiſing the ſmaller ones: By the help then of a magnifying glaſs of two inches focus, we may diſcover, whether their internal part, which contains the ſeminal leaves, appears plump, white, and moiſt. If ſo, theſe are good ſigns of their being in a vegetating ſtate; but if they are ſhriveled, inclining to brown or black, and are rancid, they cannot in the leaſt be depended upon.

The reſident factors in China are the propereſt perſons to collect the choiceſt kinds; they will follow any uſeful hints with chearfulneſs. Many valuable trees, unknown in Europe, grow in the northern provinces of China; the ſeeds of theſe may be obtained by means of the miſſionaries at Pekin: that climate, though in 40 degrees of North latitude, is liable to more ſevere cold than ours in winter. So that trees from thence would thrive well with us in the open air, but much better in the ſame latitude of North-America, on account of the great heat of the American ſummers. The Secretary of the Royal Society of London correſponds with the Miſſionaries; and there is no doubt but, upon a proper application, they would with pleaſure oblige the Society, as they have done formerly, in ſending many curious ſeeds. But as the diſtance is great, and the manner of preſerving the ſeeds properly, ſo as to keep them in a ſtate of vegetation, is an affair of conſequence, the following hints may be of uſe in bringing them over to anſwer the end propoſed.

In the firſt place it ought to be carefully attended to, that the ſeeds ſhould be perfectly ripe when they are gathered; and they ſhould be gathered, if poſſible, in dry weather; afterwards they ſhould be ſpread thin on paper or matts, in a dry airy room, but not in ſunſhine. The time neceſſary for this operation will vary according to the heat of the climate, or ſeaſon of the year, from a fortnight to a month, or perhaps two may be neceſſary; the hotter the ſeaſon, the leſs time will ſuffice. This is to carry off their ſuperfluous moiſture, which if confined would immediately turn to mouldineſs, and end in rottenneſs.

As there are two methods that have ſucceeded, and put us in poſſeſſion of ſeveral young plants of the true tea-tree of China, I ſhall mention them both, in order to aſſiſt the collector in bringing home the ſeeds of many valuable plants.

The firſt is by covering them with bees-wax in the manner explained in the Phil. Tranſact. vol. LVIII. p. 75. and which is hereafter deſcribed; where the acorns vegetated freely after they had been kept a whole ſeaſon incloſed in wax*.

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* Here we muſt obſerve, that, in the experiment made on the oak acorns incloſed in wax, they were not put into it till the latter-end of February, though they had been ripe and fallen from the tree four months before, which was the latter-end of October preceding; not but that they might have been ſafely incloſed much ſooner.

However, by this time, that property, which all living ſubſtances, as well animal as vegetable, of imbibing and perſpiring, was very much abated; for the ſeeds of vegetables, like animals in their torpid ſtate, do imbibe and perſpire to a certain degree; yet this degree greatly diminiſhes in proportion to the time they are kept (under certain circumſtances of the manner in which they are kept) till at laſt they loſe their vegetating power. So that we ſee how neceſſary it is, that the larger ſeeds, that are intended to be incloſed in wax, ſhould be in ſuch a ſtate, as not to ſend forth too great a quantity of aqueous moiſture, and yet that there ſhould be ſufficient to ſupport them in this confined ſtate. Many of the tea-ſeeds lately ſent over in wax have periſhed for want of this caution.

Skilful perſons, by cutting ſome of them open and obſerving the ſtate of the kernels, will be able, after different experiments, to hit on the critical time for this operation.

It principally conſiſts in chooſing only ſuch ſeeds as are perfectly ſound and ripe. To prove this, we muſt cut open ſome of them to judge what ſituation the reſt may be in, taking care to lay aſide any that are outwardly defective, or marked with the wounds of inſects. When a proper choice of them is made, they ſhould be wiped extremely clean, to prevent any dirt or moiſture being incloſed; each ſeed then ſhould be rolled up carefully in a coat of ſoft bees-wax half an inch thick: the deep yellow Engliſh bees-wax is the beſt. When you have covered the number you intend to incloſe, pour ſome of this bees-wax melted into a chip-box of ſix or ſeven inches long, four broad, and three deep, till it is above half full; and juſt before it begins to harden, while it is yet fluid, put in the ſeeds you have rolled up in rows till the box is near full; then pour over them ſome more wax while it is juſt fluid, taking care when it is cold to ſtop all the cracks or chinks that may have proceeded from the ſhrinking of the wax, with ſome very ſoft wax; then put on the cover of the box, and keep it in as cool and airy a place as you can.

The method of incloſing tea-ſeeds ſingly in wax, and bringing them over in that ſtate, has beeen practiſed for ſome time; but few have ſucceeded, owing to the thinneſs of the coat of wax, or putting paper firſt round them, or incloſing them too moiſt.

The ſtones of mangoes have been covered in the ſame manner, but moſt of them have been pierced by inſects through the wax, and of many of them that were not pierced, their kernels were black and hard; a plain proof they had been too dry before they were incloſed, and that theſe large ſtones require as ſtrong a covering of wax as the oak acorns, to prevent the air or inſects coming to them.

It appears from experiments made by curious perſons in the Eaſt-Indies, that mangoes will vegetate ſooner by ſowing only the kernels: if then ſome of the ripeſt kernels were taken out of the ſtones cautiouſly, without bruiſing them, and preſerved in the ſame manner as the oak acorns, it would be an experiment worth trying, in order to obtain this moſt valuable tree, eſpecially if ſome of theſe kernels ſo preſerved were taken out of the wax at St. Helena, and ſown in boxes of freſh earth. The ſame might be practiſed with ſucceſs on the tea-ſeeds, as ſome of my friends, who have taken this hint, have experienced very lately.

The ſecond method that has been tried with ſucceſs is, by procuring the tea-ſeeds in their pods or capſules, when they are brought down freſh from the tea-country at the latter-end of the year, to Canton, at the time that our Eaſt-India ſhips are preparing to depart for Europe. The ſeeds then in their pods are to be put into pound or half-pound caniſters made of tin and tutenague*, with a double rim to the top: the inſide of the caniſter ſhould be firſt lined with ſilk paper, or the paper commonly uſed in China, and the ſeeds preſſed down cloſe, but not ſo as to be bruiſed. When the caniſter is near full to the neck, ſome more of the ſame paper muſt be ſtuffed in very cloſe, till it is full to the top, and then the double-rimmed cover ſhould be put on very tight. Care muſt be taken that the ſeeds are not too moiſt when they are put into the caniſter, and that they are ſound and in good order. The caniſter then is to be kept in an airy cool place. If the ſhip arrives early in England, I mean in June or the beginning of July, they may be ſown with ſucceſs; the ſooner it is done, the better chance we ſhall have of their growing. Thoſe ſeeds which I have ſeen brought home in this manner, had ſhot out roots, owing to the heat of the climates they had paſſed through, and the confined moiſture; and though not above twenty out of two hundred in the caniſter ſucceeded, yet theſe are thought a great acquiſition. Perhaps there would be leſs danger of ſo many of them putrefying, if each capſule with its ſeeds was wrapped up tight in a ſeparate piece of paper, and afterwards cloſely packed in the caniſter as before-mentioned. We ſee how long oranges, lemons, and other fruit wrapped up ſingly in papers, and put into cloſe packages, will continue ſound by the papers abſorbing the moiſture that muſt exſude from them, and which prevents their heating and putrefying.

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* Whether there is any particular antiſeptic quality or power of reſiſting putrefaction in the metallic parts of theſe kind of caniſters, I will not pretend to determine; but it is moſt certain, that there are ſulphureous mineral ſteams, very perceivable to perſons of a nice ſenſe of ſmelling, that are continually flowing from almoſt all metallic ſubſtances, eſpecially in hot weather; which ſteams being confined, may probably reſiſt putrefaction, and deſtroy inſects in vegetable bodies; and perhaps theſe may rather promote than impair their vegetative powers, as I ſhall ſhew hereafter in an inſtance of the uſe of common ſulphur applied for this purpoſe; for moſt of the tea-ſeeds had puſhed forth roots in the caniſter.

Tea-ſeeds, put up in this manner, require leſs trouble than thoſe that are rolled up ſingly, and afterwards immerſed in melted wax. Experience will determine which is the beſt method. When the ſhip arrives at St. Helena, they may be eaſily examined to ſee in what ſtate they are, by cutting ſome of them open; and if they are ſound, ſome of them ſhould be ſown immediately in caſes or tubs of freſh earth, well ſecured from rats, and the vacancy made in the caniſter immediately filled up, and ſtuffed very cloſe with the ſame ſort of paper, to prevent the air getting to the reſt, which would ſoon ſpoil them. Theſe that are thus put into earth ſhould have but little water given to them till they paſs the tropic of Cancer; otherwiſe they will ſpire up very weak, from the great heat, and want of a free circulation of good air.

It might be proper, after the ſhip has paſſed the tropic of Cancer, near the latitude of 30 degrees North, to ſow ſome more ſeeds in the ſame boxes, by which experiment we may judge the better of the propereſt place to ſow the ſeeds at ſea. It has been practiſed by many, to ſow the ſeeds immediately on leaving China; but this is rarely attended with ſucceſs, particularly on account of the bad weather too often met with in coming round the Cape of

Good Hope; beſide, the young plants are apt to grow too freely and ſlender in their confinement, and therefore leſs able to bear the cold air when they arrive in this latitude.

If by chance the tops of ſuch plants as come up ſhould be broken off by any accident, the earth and ſeeds ſhould not be thrown away, for the remaining part of the ſtem next to the ſeed will ſhoot up afreſh, as I have experienced in the pot of oak acorns (that grew after they had been preſerved a ſeaſon in wax); ſome of the tender young plants were by accident broke off ſhort cloſe to the earth; but before the ſummer was over they grew up again, full as vigorouſly as thoſe that were not hurt.

The following is a deſcription of a proper-ſized box to ſow the ſeeds in, in the Eaſt-Indies or on the voyage. It ſhould be three feet long, fifteen inches wide, and eighteen or twenty inches deep, or more, as it may be found convenient, with a proper cover of wire to ſecure the ſeeds or young plants from vermin, and a lid with hinges to ſhut down over the wire, as there may be occaſion, and a handle at each end, to move the box eaſier to and fro. The ends of the box near the top muſt be bored full of holes, to let the crude vapours paſs off that ariſe while the cover is obliged to be let down; or a ſmall valve or wooden ſhutter at each end to open outwards, of ſix inches long and three broad; the openings to be defended with wire, to prevent the rats getting into the box. This hint is ſufficient to ſhew that air is abſolutely neceſſary, and an ingenious carpenter will eaſily contrive ſmall doors or openings all round for the health of the young plants.

Or a caſk, perhaps, may be made equally as convenient for this purpoſe, as the cooper on board a ſhip has always ſpare caſks more ready than boxes. The following is the proportion it ſhould be of: two feet three inches high, two feet bung diameter, and one foot nine inches head diameter; there ſhould be a large opening at the top wired over, the wired part of which might be lifted up at pleaſure, and a lid with hinges to cover it; this may

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be either circular or ſquare, as will be moſt convenient, the larger the better; and on the upper part of the ſides there may be four or five little openings wired, with doors to each, for the ſake of giving air all round upon ſome occaſions. Care muſt be taken not to expoſe the young plants to ſtrong ſunſhine: ſometimes, when the lid and doors are open, it may be neceſſary to throw a matt or thin cloth over them, but this muſt depend on the judgement of the perſon who has the care of them; there ſhould be handles fixed to the ſides, to move it with more ſafety.

There ſhould be a layer of wet moſs, of two or three inches deep, at the bottom of the box or caſk; or, if that cannot be got, ſome very rotten wood or decayed leaves, and then freſh loamy earth, about twelve inches deep, both of which will ſink to a foot deep: the wet moſs is intended to retain moiſture, and to keep the earth from drying too ſoon.

The ſurface of the earth ſhould be covered with moſs cut ſmall, which now and then on the voyage ſhould be waſhed in freſh water, and laid on the earth again to keep the ſurface moiſt, and to waſh off mouldineſs or ſaline vapours which may have ſettled on it. When the plants come up, it will be proper to ſave what rain-water can be got, which will encourage their growth, and be of more ſervice than the water drawn out of caſks that have been long on board the ſhip.

Theſe kind of boxes or caſks will be very proper to ſow many ſorts of ſuch ſeeds in as are ſo difficult to be brought from China, and other parts of the Eaſt-Indies, to Europe in a vegetating ſtate; ſuch as the lechee, mangoes, mangoſteens, pepper, marking nuts, various ſorts of peaches, roſes, oranges, citrons, lemons, &c.

And nothing can be more convenient than theſe caſks, for ſending olive plants, capers, young vines, &c. &c. to our diſtant American plantations. The ſize may be varied as the plants to be ſent may require.

To this I muſt add a method that promiſes ſucceſs for bringing over plants from the Weſt-Indies, and the ſouthern parts of North-America, particularly Weſt-Florida, the voyage from hence being longer than from the Weſt-Indies, and more attention is required to keep the plants in health, than from any other parts of our North-American ſettlements: but as there is a good deal of difference in the climates of theſe places, it will be neceſſary to obſerve, that plants from the Weſt-Indies ſhould be put on board in the latter-end of Spring, ſo as to arrive here in warm weather, otherwiſe they will be deſtroyed by the cold of this latitude; and the ever-greens, which are the moſt curious from Weſt-Florida, muſt be ſent in the winter months, while their juices are inactive, ſo as to arrive here before the heats come on. If the plants ſent from theſe countries were planted in pots or boxes, and kept there a year, they might be brought over with very little hazard; or even if they were firſt tranſplanted from the woods into a garden, till they had formed roots, they might be ſent with much more ſafety.

The ſize of the boxes that will be moſt convenient for ſtowing them on board merchant-ſhips, where there is very little room to ſpare, ſhould be three feet long, fifteen inches broad, and from eighteen inches to two feet deep, according to the ſize of the young trees; but the ſmalleſt will be moſt likely to ſucceed, provided they are well rooted. There muſt be a narrow ledge nailed all round the inſide of the box, within ſix inches of the bottom, to faſten laths or packthread to form a kind of lattice-work, by which the plants may be the better ſecured in their places. If the plants are packed up juſt before the ſhip ſails, it will be ſo much the better.

When they are dug up, care muſt be taken to preſerve as much earth as can be about their roots; and if it ſhould fall off, it muſt be ſupplied with more earth, ſo as to form a ball about the roots of each plant, which muſt be ſurrounded with wet moſs, and carefully tied about with packthread, to keep the earth about the roots moiſt: perhaps it may be neceſſary to incloſe the moſs with ſome paper or broad leaves (as the palmetto) that the packthread may bind the moſs the cloſer. Loamy earth will continue moiſt the longeſt. There muſt be three inches deep of wet moſs put into the bottom of the box, and the young trees placed in rows upright cloſe to each other, ſtuffing wet moſs in the vacancies between them, and on the ſurface; over this palmetto leaves, if to be had, ſhould be put to keep in the moiſture, and over them the laths are to be faſtened croſs and croſs to the ledges or packthread to be laced to and fro, to keep the whole ſteady and tight. The lid of the box ſhould be either nailed down cloſe, or may have hinges and a padlock to ſecure it from being opened, as may be found neceſſary, with proper directions marked on it to keep the lid uppermoſt. There muſt be two handles fixed, one at each end, by which means there will be leſs danger of diſturbing the plants. Near the upper part of the ends of the box, there muſt be ſeveral holes bored to give air: or in making the box there may be a narrow vacancy left between the boards of one-third of an inch wide, near the top, to let out the foul air; and perhaps it may be neceſſary to nail along the upper edge of theſe openings liſt, or ſlips of ſail-cloth, to hang over them, to ſecure the plants from any ſpray of the ſea; and at the ſame time it will not prevent the air from paſſing through. Boxes with plants packed in this manner, muſt be placed where there is free air, that is, out of the way of the foul air of the ſhip's hold.

If the plants ſhould be taller than the depth of the box mentioned here, they may be placed length-ways in the ſame ſized boxes: but then care muſt be taken to ſecure their roots in the moſs at one end of the box, ſo as not to be ſhook out of their places, and laths ſhould be nailed acroſs the inſide to ſupport their branches, and keep them from preſſing upon one another. The beſt moſs that can be uſed on theſe occaſions is the *Sphagnum paluſtre*, or ſwamp moſs, which is very ſoft, whitiſh, and ſpongy; it will retain water a long time, and not be liable to putrefy.

The following method of preſerving ſeeds from turning rancid from their long confinement, and the great heat of the climates which they muſt neceſſarily paſs through from China, was communicated to me ſome years ago by the celebrated Profeſſor Linnæus, of Upſal, in Sweden. He adviſes, that each ſort of ſeed ſhould be put up in ſeparate papers, with fine ſand among them, to abſorb any moiſture (dried, loamy, or ſoapy earth may be tried): theſe papers, he ſays, ſhould be packed cloſe in cylindrical glaſs, or earthen veſſels, and the mouths covered over with a bladder, or leather tied faſt round the rims: he then directs that theſe veſſels, with the ſeeds in them, ſhould be put into other veſſels, which ſhould be ſo large, that the inner veſſel may be covered on all ſides, for the ſpace of two inches, with the following mixture of ſalts. Half common culinary ſalt; the other half to conſiſt of two parts of ſalt-petre, and one part of ſal-ammoniac, both reduced to a powder, and all thoroughly mixed together, to be placed about the inner veſſel, rather moiſt than dry. This he calls a refrigeratory; and ſays it will keep the ſeeds cool, and hinder putrefaction. Perhaps if ſmall tight boxes, or caſks or bottles of ſeeds were incloſed in caſks full of ſalts, it might be of the ſame uſe, provided the ſalts do not get at the ſeeds; and as ſal-ammoniac may not be eaſily met with, half common ſalt, and the other half ſalt-petre, or common ſalt alone, might anſwer the ſame end. But it would be very neceſſary to try both methods, to know whether the latter would anſwer the purpoſe of the former, as it would be attended with much leſs trouble, and might prove a uſeful method to our ſeedſmen, in ſending ſeeds from hence to thoſe warm climates.

The ſmalleſt ſeeds being very liable to loſe their vegetative power by long voyages through warm climates, it may be worth while to try the following experiment upon ſuch kinds as we know for certain are ſound. Dip ſome ſquare pieces of cotton cloth in melted wax, and while it is ſoft and almoſt cold, ſtrew the ſurface of each piece over with each ſort of ſmall ſeed, then roll them up tight, and incloſe each roll in ſome ſoft bees-wax, wrapping up each of them in a piece of paper, with the name of the ſeed on it; theſe may be either ſurrounded as before with ſalts, or packed without the ſalts in a box, as is moſt convenient.

There are many ſeeds, which we receive both from the Weſt-Indies and the ſouthern parts of our North-American colonies, as South-Carolina, Georgia, &c. which the gardeners find very difficult to raiſe here, unleſs the following method is purſued. Divide a box, according to your quantity and ſorts of ſeeds, into ſeveral ſquare partitions ; then mix the ſeeds with loamy earth and cut moſs, and put each ſort into its ſeparate cell, filling it up to the top: the earth and moſs muſt be rather inclining to dry than wet; then nail the lid down very cloſe on your box, keeping it in an airy ſituation. If the voyage does not exceed two months, they will arrive in good order in the ſpring; and, though many of them may begin to germinate, yet, if they are ſown directly, they will ſucceed much better than thoſe that are brought over in papers, as is well known to our moſt curious gardeners. Seeds of the nutmeg-tree from Tobago, the cinnamon-tree, the cacao or chocolate-nut, and Avocado pear, muſt be brought in this manner. Seeds of all the ſorts of magnolias, ſtewartias, chionanthus, and many others from South-Carolina, will ſucceed better this way, than any other method we yet know.

Thereare many valuable ſeeds may be brought from the South of France, Italy and Turkey, particularly the rarer kinds of oaks, the Alkermes oak, the Velani oak, the gall-bearing oak, which ought to be preſerved in bees-wax, as the voyage is often very long, and the Turkey ſhips frequently detained on account of the quarantine.

The ſeeds of many of the ſmall ſucculent fruits may be brought to England from very diſtant parts, by preſſing them together, ſqueezing out their watery juices, and drying them in ſmall cakes gradually, that they may become hard; they may be then wrapt up in white writing paper, not ſpongy, as this is apt to attract and retain moiſture: but I believe it will be found, that a covering of wax will be better than one of paper.

The Alpine ſtrawberry was firſt ſent to England in a letter from Turin to Henry Baker, Eſq; F. R. S. by preſſing the pulp with the ſeeds thin upon paper, and letting it dry before they were incloſed. The paper mulberry from China was brought hither about the year 1754, much in the ſame manner. Formerly, varieties of the Arbutus, from the ſouthern parts of France, were brought over in thin dried cakes; and a few years ago the Arbutus Adrachne ſeeds were ſent in the ſame manner from Aleppo by the late Dr. Al. Ruſſel. Our mulberries, ſtrawberries, and other ſucculent fruits, may be conveyed to diſtant parts by the ſame method. The pulp, when dried, hardens like a varniſh, and keeps the ſeeds from the air (provided they are kept dry), as the larger kinds are by bees-wax.

Theſe hints may prompt us to try the larger ſucculent fruits; for inſtance, the mangoes, lechees, and others of this kind: if their fleſhy part, when they are very ripe, was brought to the conſiſtence of raiſins or dried figs, it would keep their kernels plump, and in this ſtate they might be better preſerved in wax, than by any other method yet known. The nutmegs in the ſame manner muſt not be diveſted of their pericarpium before they are incloſed in wax. The marking nut, or anacardium orientale, ſhould be brought over with its apple or receptacle dried, adhering to it before it is incloſed in wax. Of this valuable plant we are yet ignorant, even of its leaves and bloſſoms, though very Eaſt-India ſhip brings ſome of the nuts, but none of them have yet been raiſed in England. This is the tree ſo much commended by Kæmpfer, in his Amœnitates Exoticæ, p. 793. for yielding the Siam varniſh of ſo much conſequence in China and Japan, for the firſt layer of their varniſh, in all their curious lacquered ware. There is another fruit which I ſhall recommend to be brought in wax from China; this is called by the Chineſe Unchee, or Um-Ky; it is deſcribed by Doctor Solander, in the Philoſophical Tranſactions, vol. LII. p. 654. Feb. 20. where there is a very exact figure of it, taken from ſpecimens in the Britiſh Muſeum, as they are preſerved in ſeveral Hortus Siccus's; the volumes in which they are to be found are particularly enumerated by the Doctor, with an account of their great uſe in dying ſcarlet: this ſhrub may be cultivated in our American iſlands. The pulpy part among the ſeeds gives, when put into warm water, a very lively yellow colour, which is much wanted among the dyers. This plant is now cultivated in our curious botanical gardens from cuttings, and is known by the name of the ſingle Gardenia, or the ſingle Cape Jaſmine of Miller: it was raiſed from ſeeds about ten years ago, brought from China by Thomas Fitzhugh, Eſq; and is often found among the boxes of ſeeds ſent from China, but not in a vegetating ſtate. Mr. Fitzhugh followed the Linnæan manner of bringing over ſeeds ſurrounded with ſalt, which he thinks a very good method.

Our ſeedſmen are much diſtreſſed for a proper method to keep their ſeeds ſound, and in a ſtate of vegetation, through long voyages. Complaints are made, that, when their ſeeds arrive in the Eaſt-Indies, and often in the Weſt-Indies, few of them grow; but that moſt of them are full of inſects, or, what they term weevilly. This ſeems to proceed from the damp and putrid heat of the hold, or too long confinement in cloſe warm air, which brings theſe animals to life, which ſoon begin to prey on the inſide of the ſeeds, and thoſe ſeeds that are oily turn rancid. This putrid penetrating ſteam, that ſtrikes every one upon opening the hatches of a full loaded ſhip's hold after a long voyage, it is this that does the miſchief to ſeeds. This vapour, as the excellent Doctor Hales obſerves, without frequent ventilating, will become fatal to vegetable ſubſtances, as well as animals.

When the cavalry of our army in Germany was under the neceſſity of being ſupplied with hay from England, the difference was too manifeſt between the hay that had been but a month on board, and freſh hay, that had never been confined in the hold of a ſhip.

Experiments have been made on the beſt hemp from Ruſſia, and hemp of Engliſh growth, by perſons belonging to the navy, of great credit and honour, and the difference in the ſtrength was amazing; the length of the voyage from Ruſſia, with the very cloſe package that is neceſſary to ſtow that article on board of a ſhip, raiſes ſuch a heat, as to ſhew evident ſigns of putrefaction begun, which muſt weaken the ſtrongeſt vegetable fibres*.

To illuſtrate this farther in an inſtance of the different manner of packing and ſtowing ſeeds for a long voyage, which has lately come to my knowledge and may be of uſe, as it not only points out the error, but in ſome manner how to avoid it.

A gentleman, going to Bencoulen in the iſland of Sumatra, had a mind to furniſh himſelf with an aſſortment of ſeeds for a kitchen

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* This hint may be worthy of the conſideration of the linen as well as the hempen manufacturers, both in Great-Britain and Ireland, as it will ſhew them the neceſſity of raiſing both hemp and flax, the firſt principles of theſe moſt uſeful and neceſſary manufactures, at home; by convincing them, from experiment, of the great difference they will find between the comparative ſtrength of what we raiſe at home, and what we bring from beyond ſea.

garden;

garden; theſe were accordingly packed up in boxes and caſks, and ſtowed with other goods in the hold of the ſhip.

When he arrived at Bencoulen, he ſowed his ſeeds; but ſoon found, to his great mortification, that they were all ſpoiled, for none of them came up.

Convinced, that it muſt be owing to the heat of the ſhip's hold, and their long confinement in putrid air, and having ſoon occaſion to return to England; he determined in his next voyage thither, to pack them up in ſuch a manner, and place them ſo, as to give them as much air as he could, without the danger of expoſing them to the ſalt-water; and therefore put the ſmaller kinds into ſeparate papers, and placed them among ſome clean ſtraw in a ſmall cloſe net, and hung it up in his cabbin; and the larger ones he put into boxes, ſtowing them where the free air could come at them, and blow through them: the effect was, that as ſoon as he arrived at Bencoulen he ſowed them, and in a little time found, to his great ſatisfaction, that they all grew extremely well. It is well known to our ſeedſmen, that, even here at home, ſeeds kept in cloſe warehouſes, and laid up in heaps, frequently ſpoil, unleſs they are often ſifted, and expoſed to the air.

Seeds ſaved in moiſt cold ſummers, as their juices are too watery, and the ſubſtance of their kernels not ſufficiently hardened to a due ripeneſs, are by no means fit for exportation to warmer climates.

Our acorns, unleſs ripened by a warm ſummer, will not keep long in England: thoſe acorns that are brought from America, and arrive early in the year, generally come in good order, owing to their juices being better concocted by the heat of their ſummers, and are not ſo apt to ſhrivel when expoſed to the air as ours are.

Theſe hints are given to ſhew how neceſſary it is to take care, that the ſeeds we ſend abroad ſhould be perfectly ripe and dry.

One of the methods now practiſing in ſending garden-ſeeds to the Eaſt and Weſt-Indies, is to put a ſmall piece of camphire into each parcel: as to this experiment, we are not yet certain of its ſucceſs; the hint is taken from the common method of preſerving butterflies, moths, beetles, and other inſects, from being deſtroyed by very minute animalcules, which are apt to infeſt them.

Flowers of ſulphur in water, in a certain proportion, will deſtroy inſects that infeſt plants, and will rather encourage than hurt their vegetation, as appears from a method practiſed here with ſucceſs for many years, in the culture of the ananas, or pine-apple plant, by one of the moſt eminent fruit and kitchen gardeners in England *. The inſide of boxes and caſks ſhould be waſhed

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* In order to introduce the method of deſtroying inſects that infeſt the ananas, or pine-apple plant, it may not be diſagreeable to the reader, to know ſome general rules (though foreign to our preſent ſubject), that are neceſſary to be obſerved in the culture of that curious and delicate fruit.

“ The ſtems of the heads and ſuckers ſhould not be ſtripped up higher than to the place
“ where they appear white under the leaves you pull off.

“ The compoſition to plant them in ſhould be three parts of ſtrong freſh loam, and the
“ fourth part rotten dung; they ſhould be mixed together, and often turned, for a year at leaſt
“ together before it is uſed. The pots ſhould be rather ſmall than large, in proportion to the
“ plants at all times.—The plants ſhould be put into the ſtove or ſtore-pit, and kept with a
“ briſk heat, ſhading them from the violence of the ſun, and ſprinkled every day, or twice a
“ day, if the weather is hot.—In a week they will have roots enough to ſupport themſelves,
“ and ſhould be inured by degrees to the full ſun, and the oftener they are ſprinkled in warm
“ weather, the faſter they will grow; but when they are ſprinkled, they ſhould be ſhut up
“ cloſe, and ſhaded for an hour or more; then give them air, and take away the ſhade.
“ Thoſe plants that are large, and that you deſign ſhould bear fruit the next year, ſhould be
“ put into larger pots the latter-end of Auguſt, when ſome new tan ſhould be added, and
“ mixed up with that which they ſtood in till this time.—In November, the tan-bed ſhould
“ be turned over two-thirds of the way down, and a good quantity of new tan mixed with it,
“ throwing away ſome of the rotteneſt, which may be ſeparated by ſcreening it: this will heat
“ ſufficiently to carry the plants on till January or February, when they will ſhew their fruit,
“ if the fire heat is kept up as uſual. As ſoon as the plants begin to grow in the ſpring,

with water that has been impregnated with ſulphur; or, perhaps, the Hepar Sulphuris, or liver of ſulphur, which is ſulphur combined with an alkaline ſalt to make it ſoluble in water, would be more effectual: a little of this ſolution laid over the inſide of a box or caſk, with a hog's-briſtle bruſh, would raiſe ſuch a penetrating ſtench in warm weather, when confined, as to deſtroy all kind of inſects. Or the caſks and boxes might have brimſtone burnt in them before the ſeeds are put in them: but the ſucceſs muſt depend on experiment. There is great probability, that the vegetative powers of the ſeeds will not be hurt by the fumes of the ſulphur, if we may reaſon from the uſe of it in deſtroying the inſects in the pine-apple, and rather promoting than hurting their vegetation †.

Beſides

" they ſhould be often ſprinkled with water made a little warm only, by ſtanding in the ſtove. But when the plants are in bloom, care muſt be taken not to wet the bloſſom, which would prevent the fruit ſwelling near ſo large as it would if they had been kept dry at that time.

" In February or March, before the plants blow, the tan-bed ſhould be turned over, and a little more new tan added to it, and all the plants that have ſhewed for fruit ſhould be put into larger pots; but not to put any plants that you deſign to have fruit into larger pots, till they ſhew for fruit, nor ſhould any of their roots be cut off; but take off all the earth, from the ſurface down to the roots, of thoſe you put into larger pots. The ſooner you ſhift your ſtove plants in the ſpring into freſh earth and larger pots the better, as it will be a means, not only of ſetting them a-growing early, but keeping them from fruiting. It is a practice among our nurſery-men, to force the young plants in hot-beds of horſe dung with a moiſt ſtrong heat, which puſhes them forwarder than tan-beds during their growing ſtate, which is from March till the end of September.

" Leſt the tan in the fruiting ſtove ſhould cool ſuddenly, either through neglect or want of judgement, it would not be improper to have a flue run zig-zag under the bottom of the tan-pit, the top of which ſhould be level with the bottom of the tan-pit, but not to be made uſe of on any account, unleſs when the heat ſuddenly leaves the tan.

" If the plants are troubled with inſects, take a pound of flower of brimſtone and put it into ten gallons of water, and water the plants well all over with it. This will deſtroy the inſects, and promote vegetation."——It muſt be remembered, that the water muſt be of the ſame degree of warmth with the air in the ſtove.

† Various kinds of pulſe and grain, which I have lately received from different parts of the Eaſt-Indies, have been eaten hollow, and moſt of them deſtroyed, by a kind of very ſmall beetle, or inſect of the weevil kind.

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Beſides this method of deſtroying inſects, there is another, which, for the benefit of mankind, ſhould be generally known, particularly as moſt ſhips that paſs through warm climates are infeſted with thoſe diſagreeable ones called cock-roaches.

The following preparation will prevent them from ſpoiling many valuable articles on the voyage, and perhaps be of uſe in ſaving ſeeds, books, and papers, which they are apt to deſtroy on board of ſhips: at the ſame time we ſhall find that this preparation is equally deſtructive to all other inſects. Diſſolve one ounce of crude ſal-ammoniac in a quart of water, then put in two onnces of corroſive ſublimate mercury. This ſolution, when uſed, ſhould be firſt heated in the following manner: put the liquor into a phial, and ſet it in a tin pot of water on the fire, and when the water boils, the ſolution in the phial will be heated enough. N. B. The phial with the ſolution muſt be put into the water when it is cold, and then there will be no danger of breaking the phial: a piece of packthread or wire ſhould be put round the neck of the phial, to lift it in and out of the water: it will corrode every veſſel but glaſs; therefore it is neceſſary that it ſhould be heated in the foregoing manner. You muſt uſe a hog's-briſtle bruſh to waſh over any box or furniture.

It is likewiſe too well known, the great damage done to wheat by this pernicious inſect the weevil, which, after feeding on the inſide of the grain, eats its way out: how it comes into the grain, is a conſideration worthy of the attention of the philoſopher.

The ſame obſervation may be made on turnip-ſeeds kept confined in ſacks in hot weather, where the moiſt heat brings the animals to life. This affords us a very uſeful hint in regard to the black fly, as it is called, that deſtroys the newly-ſown turnips in dry weather, juſt as their lobe leaves are expanded; and points out to us the probability that this little animal, which afterwards deſtroys the tender plant, may have exiſted in the ſeed itſelf; ſo that it is a conſideration well worth the farmer's notice, to try either by fumigating his ſeed well with burnnig brimſtone, or by ſoaking them in brimſtone and water, or by diſſolving a ſmall portion of liver of ſulphur in water, and ſteeping his ſeed in it, to deſtroy theſe animals. If theſe experiments are made with judgement, there is great probability that we ſhall able to deſtroy the animals without affecting the vegetation of the plant.

The heating of the liquor will make it penetrate better into wood, and no inſect will come near where it has been once rubbed over. If this liquor is put into the paſte uſed in binding of books, the cockroaches or other inſects will never touch them. It will likewiſe preſerve the hair and feathers of dried ſpecimens of birds and beaſts, and the bodies of curious butterflies, from being deſtroyed by minute animalcules; and will be found to be an effectual remedy againſt bugs, and is one of the great ſecrets of the bug-killers. Another is a ſolution of corroſive ſublimate mercury, diſſolved in ſpirit of wine, and lowered with water: this leaves no ſtain on furniture.

As tobacco is univerſally known by the gardeners to deſtroy inſects by its deleterious quality, and as tobacco-ſand is to be had upon very reaſonable terms, it is recommended to ſeedſmen to mix it up with their ſmaller ſeeds on exportation, as it may abſorb their humidity, prevent their putrefaction, and deſtroy the inſects that are in them. But it muſt be obſerved, that it is not meant here, that it will keep them from the penetrating noxious ſteams that ariſe from the ſhip's hold, particularly in warm climates; for I am doubtful, whether even a thin coat of wax would be a ſufficient guard in that dangerous ſituation. And as to the larger ſeeds, the putting ſome fine cut-tobacco in ſmall quantities looſe among them, ſeems to carry ſome probability of being at leaſt an experiment worth trying, to prevent their being deſtroyed by inſects.

In ſhort, the demand for our kitchen-garden-ſeeds would be very great, both in the Eaſt and Weſt-Indies, if we could hit on a proper method of ſending them into thoſe warm climates in a vegetating ſtate; ſo that it is well worth our attention, as an article of commerce, to try every experiment that may lead to ſo uſeful a diſcovery.

I hope, then, theſe hints may incite curious gentlemen, as well as intelligent ſeedſmen and gardeners, to begin a courſe of theſe kind of experiments; in the progreſs of which, I am perſuaded, they will receive great pleaſure as well as knowledge, and both do honour to themſelves, and a real ſervice to their country. But as gardeners and ſeedſmen, from their conſtant experience, muſt know the nature of ſuch bodies better than moſt gentlemen, eſpecially as it is their daily buſineſs; I don't doubt but that excellent and uſeful Society for the encouragement of arts, manufactures, and commerce, will amply reward their diſcoveries.

⁂ It may be neceſſary to add to the article of preſerving ſeeds in wax, that whereas many of the valuable kinds, ſuch as cloves, pepper, &c. are too ſmall to be rolled up in wax ſeparately; many of them may be incloſed in ſmall balls of warm wax in ſuch a manner, as to be kept from touching each other; and when the balls are cold, they may be put into melted wax, in the ſame manner as in the experiment to preſerve oak acorns, tea-ſeeds, &c. in wax, before-mentioned.

The following Catalogue of ſuch Plants as deſerve the particular Attention of our American Colonies, are here exhibited in one View, in order to incite ſuch Perſons as have it in their Power to procure the Seeds or Plants of the moſt valuable of them, for this intereſting Purpoſe.

To avoid Confuſion in the Botanical Names, both the generical and ſpecific, or trivial Names of the Plants, are ſet down, with the Page referred to in the celebrated Linnæus's Second Edition of his Species of Plants.

Other Authors of the beſt Authority are mentioned, where Linnæus is ſilent.

Latin Names.	2d Ed. Lin. Sp.	Engliſh names.	Obſervations.
Rubia Peregrina	p. 158	Turkey Madder	The firſt is ſuppoſed to be the ſame that is now cultivated in Smyrna for a crimſon dye.
Rubia Tinctorum	p. 158	Dyers Madder *	
Quercus Suber	p. 1413	Cork-bearing oak	Grows in the ſouthern parts of France, Spain, and Portugal.

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* This plant is a native of the warmeſt parts of Europe, and is better calculated for the climate of the Floridas than either of Holland or England, where it is cultivated; but principally in the former, from whence we are chiefly ſupplied with this valuable dye. The chemiſts ſay, and with reaſon, that the warmth of the climate exalts the colour. If ſo, it may be well worth the attention of the publick to encourage the planting of ſo valuable an article of commerce in a climate and ſoil that ſeems ſo much better adapted to it, where the land is cheap, and where vegetation is ſo much quicker and more luxuriant; and while we encourage the growth of it in our colonies, we may have the advantage of manufacturing this valuable commodity at home, for which at preſent we pay *ſums ſcarcely credible*, to the Dutch.

Latin Names.	2d Ed. Lin. Sp.	Engliſh Names.	Obſervations.
Quercus Ægilops	p. 1414	Avellanea or Valenida oak	The cups of the acorns, which are very large, uſed here in dying, grow in Greece and Natolia, particularly in the Iſland of Zia in the Archipelago, where Tournefort ſays they gather in one year 5000 hundred weight.
Quercus Gallifera	Parkinſon 1386	Gall-bearing oak	Galls from Aleppo and Smyrna. This oak is not yet known in England: The Acorns may be brought over in Wax, and ſent to the Floridas, Georgia, and S. Carolina.
Carthamus Tinctorius	Lin. Sp. 1162	Safflower	Much uſed in dying, grows in Egypt.
Rhamnus catharticus minor Rhamnus Saxatilis	Tournft. 593 Lin. Sp. 1671	Buckthorns that produce yellow berries of Avignon.	Uſed by painters and dyers; both theſe plants produce berries fit for this purpoſe.
Olea Europea	p. 11	Olives of ſeveral varieties	For oil; theſe grow in France, Spain, and Italy. Young Plants and ripe Fruit of the French and Spaniſh ſorts, may be brought from thence.
Seſamum Orientale	p. 883	Oily grain	Propagated in the Levant for oil, which does not ſoon grow rancid by keeping.
Goſſypium herbaceum Goſſypium hirſutum	p. 975	Two ſorts of annual cotton	Both theſe kinds of annual cotton are yearly ſown in Turkey, and would grow well in the warm climates of N. America, as the Floridas, Georgia, Carolina, and Virginia.

Latin Names.	2d Ed. Lin. Sp.	Engliſh Names.	Obſervations.
Salſola Soda Salſola Sativa and Chenopodium maritimum	p. 323 p. 321	Theſe kinds of glaſſwort for Barilla	Theſe are ſown yearly in fields near the ſea in Spain, for making Barilla, for ſoap, glaſs, &c.
Ceratonia Siliqua	p. 1513	Locuſt-tree or St. John's Bread	The pods are excellent food for hard-working cattle, and uſed for this purpoſe on the ſea-coaſt of Spain, where they are eaſily propagated from ſeeds or cuttings.
Piſtachia Vera	p. 1454	Piſtachia-tree	They are propagated about Aleppo, where the female or fruit-bearing ones are ingrafted on the ſtocks raiſed from the nuts.
Piſtachia Terebinthus	p. 1455	Chio turpentine-tree	This kind of turpentine is uſed in medicine.
Piſtachia Lentiſcus	p. 1455	Maſtick-tree	Gum Maſtick from the iſle of Scio; as this tree, commonly called the Lentiſcus, is doubted to be the genuine Maſtick-tree, ſeeds of the true kind may be procured from the iſle of Scio.
* Styrax Officinale	p. 635	Gum Storax-tree	This tree grows in Italy, Syria, and India; but the warmer climates yield the beſt gum.
Convolvulus Scammonia	p. 218	Gum Scammony	Seeds of the Plant, from whence this excellent drug

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* There is a reſinous juice, which, by age, hardens into a ſolid brittle reſin, of a pungent, warm, balſamic taſte, and very fragrant ſmell, not unlike the Storax calamita, heightened with a little ambergriſe, which is produced from the Styrax aceris folio of Ray, or Liquidambar Styraciflua of Linnæus, Spec. plant. 1418, which grows in perfection in the Floridas. This, Dr. Lewis, in his Materia Medica, p. 353, ſays, might be applied to valuable medicinal purpoſes.

The French, in Du Pratz' Hiſtory of Louiſiana, ſpeak with rapture of its healing qualities, and the high eſteem it is in among the Indians of Florida, on account of its infinite virtues: it is known to the Engliſh by the name of the Sweet Gum-tree, and to the French by the name of Copalm.—This is well worth the attention of the College of Phyſicians, as we can have it genuine, whereas the Storax from the Eaſt is often adulterated.

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Latin Names.	2d Ed. Lin. Sp.	Engliſh Names.	Obſervations.
			is procured, were ſent into England about 20 Years ago, from Aleppo, by the late Dr. Alex. Ruſſel: it bears this climate very well, and produces ſeed in hot ſummers; but requires the warmer climates of Carolina, Georgia, and the Floridas, to make the gum-reſin that flows from it a beneficial article of commerce. It is ſo frequently adulterated in Turky, that, in order to have it genuine, it is well worth propagating in our colonies.
Papaver Somniferum	p. 726	True opium poppy	This is recommended to be ſown in our ſouthern colonies of North-America, for the ſake of obtaining the opium pure*.
Caſſia Senna	p. 539	Alexandrian purging Senna	This grows in Upper Egypt, and is brought from thence to Alexandria; it would not be difficult to procure the ſeeds of this uſeful drug.
Croton Sebiferum	p. 1425	Tallow-tree of China	This plant grows in moiſt places in China, and is of great uſe in that country.
Rheum Palmatum	p. 521	True Rhubarb	The ſeed of this plant was brought to England about five years ago, by Dr. Mounſey, F. R. S. from Moſcow, and appears by experiment to be the genuine true Rhubarb of the ſhops, and is a

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* The ſeed of this ſpecies of poppy is recommended by a phyſician of great eminence as proper for the ſame purpoſes in medicine as ſweet almonds are uſed. It is obſerved not to have the leaſt degree of a narcotic quality in it.

Latin Names.	2d Ed. Lin. Sp.	Engliſh Names.	Obſervations.
			moſt valuable acquiſition to this country, as it will grow well in a deep rich ſoil, inclining to a ſandy or gravelly loam, but not in too wet a ſituation, and may be cultivated both here and in North-America. Mr. Ingliſh has raiſed this plant with ſo much ſucceſs at his country-houſe at Hampſtead, as to be able not only to produce ſome excellent good Rhubarb, but a ſufficient quantity of ripe ſeed to make a large plantation; and at the ſame time has moſt generouſly beſtowed a great deal of ſeed to be ſent to our American colonies, where, no doubt, but it will prove in a few years a moſt beneficial article of commerce.
Calamus Rotang Pterocarpus Draco Dracæna Draco	p. 463 p. 1662 Lin. Syſt. Ed. 12. p. 246	Three ſorts of Gum Dragon, or Dragon's blood	1. From a kind of cane in the Eaſt-Indies. 2. From Java and Surinam. 3. From the Canary and Madeira iſlands.
Dolichos Soja	Lin. Sp. 1023	A kind of kidney-bean called Daidſu	Uſed for making Soye[†] or India Ketchup. See Kæmp. Amœnitat. 837.

Laurus

[†] The method of preparing Eaſt-India Soye, or India Ketchup.

Take a certain meaſure, for inſtance a gallon, of that ſort of kidney-beans, called Daidſu by the Japoneſe, and Caravances by the Europeans; let them be boiled till they are ſoft; alſo a gallon of bruiſed wheat or barley, (but wheat makes the blackeſt Soye) and a gallon of common ſalt. Let the boiled caravances be mixed with the bruiſed wheat, and be kept covered cloſe a day and a night in a warm place, that it may ferment. Then put the mixture of the caravances and wheat, together with the gallon of ſalt, into an earthen veſſel, with two gallons and a half of common water, and cover it up very cloſe. The next day ſtir it about well with a battering machine or mill (Rutabulum) for ſeveral days, twice or thrice a day, in order to blend it more thoroughly together. This work muſt be continued for two or three months, then ſtrain off and preſs out the liquor, and keep it for uſe in wooden veſſels; the older it is the clearer it will be, and of ſo much more value. After it is preſſed out, you may pour on the remaining maſs more water, then ſtir it about violently, and in ſome days after you may preſs out more Soye.

Latin Names.	2d Ed. Lin. Sp.	Engliſh Names.	Obſervations.
Laurus Caſſia	p. 528	Caſſia Lignea-tree	Grows in Sumatra.
Laur. Cinamomum	p. 528	Cinnamon-tree	In Ceylon, Guadaloupe, and in moſt of our newly ceded iſlands.
Laurus Camphora	p. 528	Camphire-tree*	In Japan, and in Sumatra, now in England in the green-houſes about London. It will grow freely where oranges and lemons do.
Cycas Circinalis	p. 1658	Sago Palm-tree	In Java, and the warmeſt parts of the Eaſt-Indies.
Amyris Gileadenſis	Lin.Mant.165.	True balm of Gilead-tree †	Lately diſcovered in Arabia by Dr. Forſkall, and deſcribed by Dr. Linnæus in a late diſſertation.
Arundo Bambo	p. 120	The true Bamboo cane	Of great uſe in China, and might be alſo in our American iſlands ‡.
Anacardus Orientalis	Kæmp. Amœn. p. 793	Siam varniſh-tree, called Ton-rak by the Japoneſe	The fruit of this is the Malacca bean, or marking nut, and the Oriental Anacardium of the ſhops. This is the common varniſh of the Eaſt-Indies, as deſcribed by Kæmpfer. This tree is unknown to the botaniſts.

* The camphire from Sumatra is greatly preferable to that of Japan; we are not certain whether it is from a different ſpecies of tree, but it ſeems well worth inquiring into, as the effects of proportionable quantities in medicine are ſurprizingly different, perhaps it may be owing to the great difference of heat in the climates.

† We have in the iſland of Jamaica, a ſpecies of tree of this genus, called by Linnæus Amyris balſamifera. See Species Plantarum, p. 496. Sir Hans Sloane, in his Hiſt. of Jam. vol. II. p. 24. calls this tree Lignum Rhodium, from the odoriferous ſmell of its wood when burnt, which it diffuſes a great way; for which reaſon he believes it to be the tree that afforded the agreeable ſcent which Columbus perceived on the ſouth ſhore of Cuba, upon the diſcovery of that iſland, as it is mentioned by ſeveral hiſtorians.—Dr. Pat. Browne, in his hiſtory of Jamaica, p. 208. calls this tree white candlewood, or roſewood, and commends it much; he ſays it is very reſinous, burns freely, and affords a moſt agreeable ſmell; and that all the parts of this tree are full of warm and aromatic particles.——Quere, Whether it is not worth while to extract the balſam, as it agrees ſo near in character and genus with that moſt valuable drug the balſam of Mecca?

‡ The French had brought this moſt uſeful plant from the Eaſt-Indies to their Weſt-India iſlands: a few roots have been got from thence to Grenada, and will perhaps in time become

Latin Names.	2d Ed. Lin. Sp.	Engliſh Names.	Obſervations.
Thea	Lin. Sp. p. 734	Tea	From Japan and China. See Kæmpfer's Amœnitates, p. 60 *.
Gardenia Florida	p. 305.	Umky of the Chineſe	Uſed in dying ſcarlet in China. The pulp that ſurrounds the ſeeds, gives in warm water a moſt excellent yellow colour, inclining to orange. See Phil. Tranſ. Vol. 52. p. 654. where there is an exact figure of it.

familiar in our iſlands. But too much pains cannot be taken in the propagation of this plant, as its uſes are manifold and extenſive, both in building, and all kinds of domeſtic inſtruments.

* It is aſſerted by ſome people, that the green tea and the bohea tea are two different ſpecies; but without foundation: they are one and the ſame ſpecies. It is the nature of the ſoil, the culture, and manner of gathering and drying the leaves, that makes the difference; for take a green tea-tree and plant it in the bohea country, and it will produce bohea tea, and ſo the contrary. This is a fact atteſted by gentlemen now in London, that have reſided many years in China, and who have had great experience in this article.

The method of bringing over this valuable plant being already deſcribed, I ſhall only mention an obſervation of the celebrated Linnæus, who is now in poſſeſſion of the true tea-tree, two of which he received from Captain Ekenberg, the commander of a Swediſh Eaſt-Indiaman, in the year 1763, who raiſed them from ſeed on the voyage. This celebrated profeſſor had tried for many years to get this curious tree into the phyſic-garden at Upſal; but, by a variety of accidents, they were all deſtroyed on the paſſage. At length, about the year 1755, Mr. Lagerſtrom, a director of the Swediſh Eaſt-India Company, brought him two plants alive to the garden at Upſal, wich he had bought in China: they grew very vigorouſly for two years; but when they came to ſhew their bloſſom, they proved to be of that genus of plants, called by Kæmpfer Tſubakki, and by himſelf Camellia, Sp. Plant. p. 982. The crafty Chineſe, when they ſold the plants to Mr. Lagerſtrom for the true tea plants, had artfully pulled off the bloſſoms.

Kæmpfer obſerves, that there is one ſpecies of Tſubakki, (ſee his Amœnit. Exoticæ, p. 853. the leaves of which they prepare, and mix with their tea, to give it a fine flavour; and Linnæus ſays, that the leaves of his Camellia are ſo like the true tea, that they would deceive the moſt ſkilful botaniſt: the only difference is, that they are a little broader. In a letter, dated Upſal, November 8, 1769, he ſays, that he has juſt received from a very great perſon in France, a ſmall branch of a plant, which was brought from China for the true tea; but it proves to be the Camellia. This caution is intended for captains of Eaſt-India ſhips, not to purchaſe the plants, but the freſh ſeeds of the tea in their capſules; which they may ſoon ſow after they paſs the Cape of Good Hope, or on other parts of the voyage as directed.

A new kind of tea-tree being this laſt ſummer brought from China, it is ſuſpected may be a Camellia; but as that is a moſt elegant flowering ſhrub, it may be as valuable an acquiſition to the gardeners as a tea-plant, conſidering the many tea-ſeeds that have ſucceeded lately, which have been brought home in wax, and otherways.

The late Lord Petre, of Thorndon-hall in Eſſex, was formerly in poſſeſſion of one of theſe beautiful Tſubakki's, or Camellia's, which was greatly admired for the elegant brightneſs of its flowers. See the figure in Edwards's Hiſtory of Birds, vol. ii. t. 67.

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Latin Names.	2d Ed. Lin. Sp.	Engliſh Names.	Obſervations.
Mangifera Indica	p. 290	Eaſt-India Mango-tree	This excellent fruit is much eſteemed in the Eaſt-Indies, and 'tis ſaid there is a tree of it now growing in the iſland of Madeira. By the deſcription which Dr. Solander gives of this fruit, at Rio Janeiro in Braſil, it is not ſo good as the Eaſt-India ſort.
Morus papyrifera	p. 1399	Paper Mulberry-tree	Uſed for making paper in China and Japan. See Kæmp. Amœnit. p. 467. This has been ſome time in the Engliſh gardens.
Cinchona Officinalis	p. 244	Jeſuits-bark tree	This grows at Loxa in the province of Peru; and could it be obtained ſo as to be cultivated in our American iſlands, would be of infinite advantage to us.
Dorſtenia Contrayerva	p. 176	Contrayerva-root	This grows in New Spain, Mexico, and Peru.
Smilax Sarſaparilla	p. 1459	Sarſaparilla-root	It is brought from the Bay of Campeachy, and the Gulph of Honduras, where it grows in plenty, and might eaſily be propagated in Florida.
Copaifera Officinalis	p. 557	Balſam Copaiva tree	In Brazil, and Martinico.
Toluifera Balſamum	p. 549	Balſam Tolu tree	This tree grows near Carthagena, in South-America.
Hymenea Courbaril	p. 537	The Locuſt or Gum Copal tree, for the fineſt tranſparent varniſh.	This tree is known to yield the true Gum Copal, and that the difference between this and Gum Anime, may be

Latin Names.	2d Ed. Lin. Sp.	Engliſh names.	Obſervations.
			be owing to ſoil and heat of climate; it grows wild in our American iſlands, the Moſkito ſhore, and in Terra Firma.
Jalapium Officinarum	Dale 183	True Jalap	This plant is ſuppoſed by ſome to be a kind of Bindweed or Convolvulus, that grows near Mexico; by others it is thought to be a ſpecies of Marvel of Peru. As we are uncertain of the genus, it is well worth enquiring into, as a moſt uſeful drug, in order to propagate it in our colonies.
Bixa Orellana	Lin. Sp. 730	Arnotto, for dying	This grows in all the warm climates of America. The French cultivate it, but what the Spaniards ſend is much richer in colour and more valuable.
Mimoſa Senegal	p. 1506	Gum Senegal tree	This grows in Ægypt, and in Senegal.
Mimoſa Nilotica	p. 1506	Gum Arabick	In Ægypt, from whence the ſeeds may be procured.
Ficus Sycomorus	p. 1513	True Sycamore of Zaccheus	This is reckoned the moſt durable timber we know. The repoſitories of the Mummies found in Ægypt are made of this timber.
Ficus Carica	p. 1513	Turkey Figs	Figs grow in the greateſt perfection in Carolina, and would become a valuable trade if they had the method of curing them as in Turkey.

Latin Names.	2d Ed. Lin. Sp.	Engliſh Names.	Obſervations.
Vitis Apyrena	p. 293	Currants or Corinthian grapes	The cuttings of this vine might be procured from Zant.
Fraxinus Ornus	p. 1510	Calabrian Manna Aſh *	This is worth trying in our ſouthern colonies, where the heats are violent in the ſummer. It is common in our nurſery gardens.
Amygdalus Communis	p. 677	Sweet Almonds	Theſe would grow to great perfection in our ſouthern colonies.
Capparis Spinoſa	p. 720	Caper tree	This ſhrub requires a rocky ſoil to grow in, as it is about Marſeilles and Toulon.
Punica Granatum †	p. 676	Balauſtians, or the bloſſoms of the double flowering pomegranate	This tree would thrive extremely well in our ſouthern provinces, and yield a profitable article in their bloſſoms. Plants of this kind are to be bought from moſt of our nurſery-men.
Lichen Roccella	p. 1622	Argal, Canary-weed, or Orchell	'Tis poſſible this valuable plant may be found in our American iſlands, as well as in the Canaries and Cape-Verd iſlands.
Ciſtus Ladanifera	p. 737	Gum Labdanum	In Spain and the Archipelago.
Bubon Galbanum	p. 364	Gum Galbanum	In Ethiopia.

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* There is no drug ſo liable to adulteration as this: and therefore, as it is a medicine ſo frequently in uſe among perſons of tender conſtitutions, eſpecially young children, great care ſhould be taken to have it genuine.

† The ſingle flowering or fruit-bearing Pomegranate, will afford the moſt grateful addition to the fruits of our colonies, and a valuable medicine. The ripe fruit full of ſeeds is to be met with at our fruit-ſhops in the winter ſeaſon: from the ſeeds of ſuch fruit this tree may be eaſily propagated.

Latin Names.	2d Ed. Lin. Sp.	Engliſh Names.	Obſervations.
Paſtinaca Opoponax	p. 376	Gum Opoponax	In Sicily.
Amomum Cardamomum	p. 2	Cardamums	In the Eaſt-Indies.
Curcuma Longa	p. 3	Tumerick	In the Eaſt-Indies.
Aſtragalus Tragacantha	p. 1073	Gum Tragacanth or Gum Dragon	In the ſouth of France and in Sicily.
Cucumis Colycinthis	p. 1435	Coloquintida, or Bitter apple	In Africa
Gentiana lutea	p. 329	Gentian	In the Alps, Apennines, and Pyrenees. To be had of the nurſery-men.
Similax China	p. 1459	China root	In China and in New Spain.
Pimpinella Aniſum	p. 379	Aniſe ſeeds	In Egypt.
Gambogia Gutta	p. 728	Gamboge	In the Eaſt-Indies.
Quercus Coccifera	p. 1413	Alkermes oak	About Marſeilles and Toulon.
Myrrha Offic.	Dale. 325	Gum Myrrh	In Abyſſinia. The characters of this plant and the five following are not yet known to the botaniſts.
Benzionum Offic.	Dale. 303.	Gum Benjamin	In Sumatra and Java.
Ammoniacum Offic.	Dale. 119	Gum Ammoniacum	In Africa
Balſamum Peruanum	Dale. 337	Natural Balſam of Peru	In Peru.
Olibanum Thus Maſculum	Dale. 348	Frankincenſe	In the Upper Egypt and interior parts of Africa.
Nux Moſchata Offic.	Dale. 302	Nutmegs with Mace *	In Amboyna.

In

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* Specimens of the Nutmeg-tree in fruit from the iſland of Tobago have been lately received by the Earl of Hillſborough, which his Lordſhip has ſent, with ſpecimens of many other curious plants,

Latin Names.	2d Ed. Lin. Sp.	Engliſh Names.	Obſervations.
Caryophyllus aromaticus	Lin. Sp. 735	Cloves	In the Molucca iſlands.
Piper Nigrum	p. 40	Pepper	Sumatra.
Garcinia Mongaſtona	p. 635	Mangoſteens	A moſt delicious fruit, grows in Java, and in ſeveral parts of the Eaſt-Indies.
Lechee		Lechee of China	This fruit is highly commended by all perſons who have been in China [*].
Ipecacuanha	Dale. 170 Margrave 17	Ipecacuanha of the ſhops, or Braſilian root.	Very uſeful in medicine, and worthy of our attention to propagate it in our Weſt-India iſlands: at preſent its genus is unknown to the botaniſts.
Ferula Aſſa Fœtida	Lin. Sp. 356	Aſſa Fœtida, or Devil's dung, called Hing in the Malay language	The gum of this plant is much much uſed in medicine. Kæmpf. 535 and 536.

To this catalogue may be added liquorice, ſaffron, and aloes ſocotorina: of the two firſt we do not raiſe near a ſufficiency at home for our own conſumption, but are obliged to import thoſe articles from Spain.

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plants, for the information of the publick, to the Britiſh Muſeum. They are certainly of the ſame genus with the true nutmeg; and poſſibly may be improved by cultivation; the mace evidently covers them, and they have all the characters and the ſame leaves with the wild Nutmeg-tree deſcribed by Rumphius, in his Herbarium Amboinenſe, publiſhed by Burman.

[*] The characters of this fruit are not yet known to the botaniſts.

A

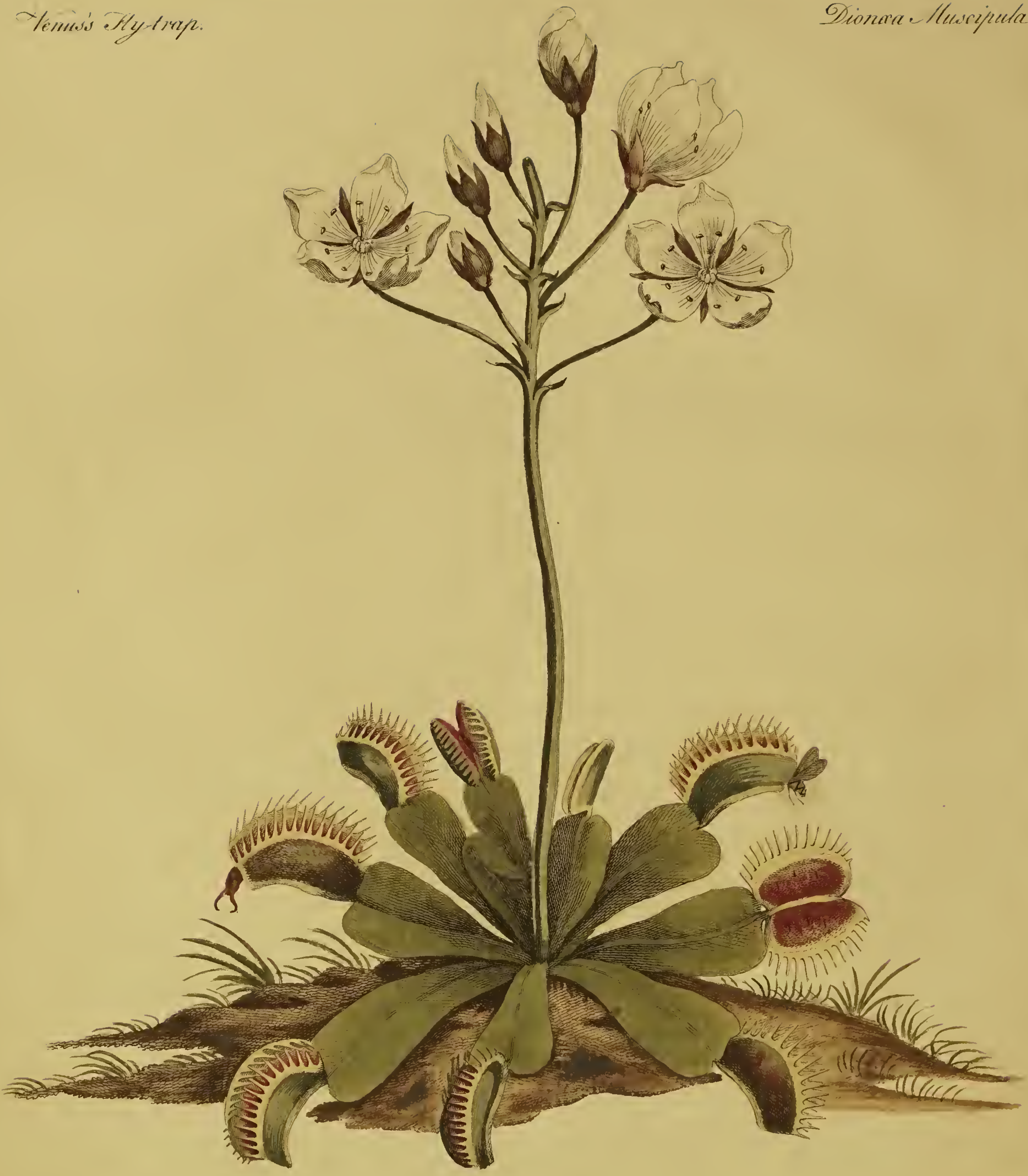
BOTANICAL DESCRIPTION
OF THE
DIONÆA MUSCIPULA,
OR
VENUS's FLY-TRAP.

A NEWLY-DISCOVERED SENSITIVE PLANT:

In a LETTER to Sir CHARLES LINNÆUS,
Knight of the Polar Star, Phyſician to the King of Sweden, and Member of
moſt of the Learned Societies of Europe,

From JOHN ELLIS, Fellow of the ROYAL SOCIETIES of
LONDON and UPSAL.

Venus's Fly-trap. Dionæa Muscipula.



A sensitive Plant from the Swamps of North America with a spike of white bloſsoms like the English Lady smock.

Each leaf is a miniature figure of a Rat trap with teeth; closing on every fly or other insect, that creeps between its lobes, and squeezing it to Death.

James Roberts sculp.

London, Sept. 23, 1769.

My dear Friend,

I KNOW that every diſcovery in nature is a treat to you; but in this you will have a feaſt.

You have ſeen the Mimoſa, or Senſitive Plants, cloſe their leaves, and bend their joints, upon the leaſt touch: and this has aſtoniſhed you; but no end or deſign of nature has yet appeared to you from theſe ſurprizing motions: they ſoon recover themſelves again, and their leaves are expanded as before.

But the plant, of which I now incloſe you an exact figure, with a ſpecimen of its leaves and bloſſoms, ſhews, that nature may have ſome view towards its *nouriſhment*, in forming the upper joint of its leaf like a *machine* to catch food: upon the middle of this lies the bait for the unhappy inſect that becomes its prey. Many minute red glands, that cover its inner ſurface, and which perhaps diſcharge ſweet liquor, tempt the poor animal to taſte them: and the inſtant theſe tender parts are irritated by its feet, the two lobes riſe up, graſp it faſt, lock the rows of ſpines together, and ſqueeze it to death. And, further, leſt the ſtrong efforts for life, in the creature thus taken, ſhould ſerve to diſengage it; three ſmall erect ſpines are fixed near the middle of each lobe, among the glands, that effectually put an end to all its ſtruggles. Nor do the lobes ever open again, while the dead animal continues there. But it is nevertheleſs certain, that the plant cannot diſtinguiſh an animal, from a vegetable or mineral, ſubſtance; for if we introduce a ſtraw or a pin between the lobes, it will graſp it full as faſt as if it was an inſect.

In the year 1765, our late worthy friend, Mr. Peter Collinſon, ſent me a dried ſpecimen of this curious plant, which he had received from Mr. John Bartram, of Philadelphia, botaniſt to the King. The flower of this ſpecimen Doctor Solander diſſected with me, and we found it to be a new genus; but not ſuſpecting then the extraordinary ſenſitive power of its leaves, as they were withered and contracted, we concluded they approached near to the *Droſera* or *Roſa Solis*, to which they have been ſuppoſed by many perſons ſince to have a great affinity; as the leaves of the moſt common Engliſh ſpecies of *Roſa Solis* are round, concave, beſet with ſmall hairs, and full of red viſcid glands.

But we are indebted to Mr. William Young, a native of Philadelphia (to whom likewiſe the Royal favour has been extended, for his encouragement in his botanical reſearches in America), for the introduction of this curious plant alive, and in conſiderable quantities. He informs me, that they grow in ſhady wet places, and flower in July and Auguſt; that the largeſt leaves, which he has ſeen, were about three inches long, and an inch and half acroſs the lobes; and obſerves, that the glands of thoſe that were expoſed to the ſun were of a beautiful bright red colour, but thoſe in the ſhade were pale, and inclining to green.

It is now likely to become an inhabitant of the curious gardens in this country, and merits the attention of the ingenious.

The Botanical Characters of the Genus Dionæa, according to the Linnæan Sexual Syſtem, where it come under the Claſs of Decandria Monogynia.

The *Calyx*, or Flower-cup, conſiſts of five ſmall, equal, erect leaves, of a concave oval form, pointed at the top.

The *Corolla*, or Flower, has five concave petals, of an oblong, inverted-oval form, blunt at the top, which curls in at each ſide, and is ſtreaked from the bottom upwards with ſeven tranſparent lines.

The *Stamina*, or Chives, have ten equal filaments, ſhorter than the petals; and their tops, which contain the male duſt, are roundiſh. This duſt, or farina fœcundans, when highly magnified, appears like a tricoccous fruit.

The *Piſtil*, or Female Organ, has a roundiſh germen or embryo ſeed-veſſel, placed above the receptacle of the flower: this is a little depreſſed, and ribbed like a melon. The ſtyle is of a thread-like form, ſomething ſhorter than the filaments. The ſtigma, or top of the ſtyle, is open, and fringed round the margin.

The *Pericarpium*, or Seed-veſſel, is a gibbous capſule, with one cell or apartment.

The *Seeds* are many, very ſmall, of an oval ſhape, ſitting on the bottom of the capſule.

I ſhall now give you a general deſcription of the ſpecies of *Dionæa* before us, called *Muſcipula*, or *Venus's Fly-trap.*

This plant is herbaceous, and grows in the ſwamps of North-Carolina, near the confines of South-Carolina, about the latitude of 35 degrees North, where the winters are ſhort, and the ſummers very hot.

The roots are ſquamous, ſending forth but few fibres, like thoſe of ſome bulbs; and are perennial.

The leaves are many, inclining to bend downwards, and are placed in a circular order; they are jointed and ſucculent: the lower joint, which is a kind of ſtalk, is flat, longiſh, two-edged, and inclining to heart-ſhaped. In ſome varieties they are ſerrated on the edges near the top. The upper joint conſiſts of two lobes; each lobe is of a ſemi-oval form, with their margins furniſhed with ſtiff hairs like eye-brows, which embrace or lock into each other, when they cloſe: this they do when they are inwardly irritated.

The upper ſurface of theſe lobes are covered with ſmall red glands, each of which appears, when highly magnified, like a compreſſed arbutus berry.

Among the glands about the middle of each lobe, are three very ſmall erect ſpines. When the lobes incloſe any ſubſtance, they never open again while it continues there. If it can be ſhoved out, ſo as not to ſtrain the lobes, they expand again; but if force is uſed to open them, ſo ſtrong has nature formed the ſpring of their fibres, that one of the lobes generally ſnaps off, rather than yield.

The ſtalk is about ſix inches high, round, ſmooth, and without leaves, ending in a ſpike of flowers.

The flowers are milk-white, and ſtand on foot ſtalks, at the bottom of each of which is a little pointed bractea, or flower-leaf.

As to the culture of it: the ſoil it grows in (as appears from what comes about the roots of the plants, when they are brought over) is a black light mould, intermixed with white ſand, ſuch as is uſually found on our mooriſh heaths.

Being a ſwamp plant, a north-eaſt aſpect will be the propereſt ſituation at firſt to plant it in, to keep it from the direct rays of the meridian ſun; and in winter, till we are acquainted with what cold weather it can endure, it will be neceſſary to ſhelter it with a bell-glaſs, ſuch as is uſed for melons; which ſhould be covered with ſtraw or a matt in hard froſts: by this method ſeveral plants were preſerved laſt winter in a very vigorous ſtate. Its ſenſitive quality will be found in proportion to the heat of the weather, as well as the vigour of the plant.

Our ſummers are not warm enough to ripen the ſeed: or poſſibly we are not yet ſufficiently acquainted with the culture of this plant.

In order to try further experiments, to ſhew the ſenſitive powers of this plant, ſome of them may be planted in pots of light mooriſh earth, and placed in pans of water, in an airy ſtove in ſummer; where the heat of ſuch a ſituation, being like that of its native country, will make it ſurprizingly active.

But your knowledge of univerſal nature makes it very unneceſſary for me to ſay any thing further, than that I am, with the utmoſt regard and eſteem,

Dear Sir,

Your aſſured friend,

and very humble ſervant,

JOHN ELLIS.

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